

GROWING AND GROWING UP

A BOOK FOR GIRLS

By M. POUT & T. F. TUCKER



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THE ALLIANCE OF HONOUR
112-114, CITY ROAD, LONDON, E.C. 1
(Entrance 114)

Also GLASGOW : 170 HOPE STREET,
CARDIFF : 35, WINDSOR PLACE.

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A COMPANION VOLUME TO THIS,
ADAPTED FOR BOYS,
IS PUBLISHED UNDER THE TITLE
“ HOW YOU GROW ”.

DEDICATED
TO
MRS. ELLEN TUCKER.

CONTENTS.

	PAGE
ONE	
HOW THIS BOOK CAME TO BE WRITTEN	7
TWO	
BEGINNING TO GROW	8
THREE	
GROWING BIGGER	16
FOUR	
GROWING UP	23
FIVE	
FULL GROWN	33
SIX	
GROWING CHARACTER	42
SEVEN	
A LITTLE BIT EXTRA	54

GROWING AND GROWING UP.

ONE.

HOW THIS BOOK CAME TO BE WRITTEN.

WHEN we were children we were always asking questions, and grown-up people used to get very tired trying to answer them. Probably you, too, put some teasers to your parents, and sometimes it is very difficult to find out the answers. Once we wrote a book for parents giving some of this information about growth that is usually rather difficult to find out, and called it "Awkward Questions of Childhood". But one day we thought "Why not write books for children too, so that they could themselves find out the answers to their questions?"

Then we had to make up our minds as to what you might want to ask us if we knew one another. As a matter of fact, scores of young friends are often asking us for all sorts of information, so we decided to write down some of the replies given to them.

How often boys and girls have been puzzled about where they came from. They are quite sure they are not like Topsy in "Uncle Tom's Cabin," who said, "I 'spect I growed. Don't think nobody never made me". They want to know how they were made; how they were born; how they grew; and about fathers and mothers. So we decided to write the answers to these questions, and that is how this book came to be written. We trust that when you have read it you will be glad that you were curious about these things, and that you will find the answers as interesting to you as the questions are to us.

Two.

BEGINNING TO GROW.

WE all like to know that we are growing. As children we used to measure our height on the door, and then looked forward to the next time when we measured, to see whether we had increased it at all, and were always very proud if we had. So in this book we want to tell you some things about your growth that may be of interest. The story will start right at the beginning, and then carry on to the time when you will have stopped growing because you will have grown up.

Perhaps some of you may have a baby brother or sister, born only a few weeks ago, who has a lot of growing to do to become as big and strong as you. When we look at such a baby we must not think that it is just starting to live. It may weigh about seven or eight pounds, but though quite little it has been growing for a long time, and is much bigger than when it began, for everyone has been much smaller than the tiniest baby you have ever seen.

When a baby begins to grow it does not seem at all like one, and a great many changes have to take place before it is ready to be born. At first it is just a very small, round egg (sometimes this is called an *ovum* or *cell*) ; if you think of the head of the smallest kind of pin you know, that will be about the size which it is then. And we each started in the same way.

It is not only in human beings that we find that there is a great difference between something that is young and one that is older. If you think what a difference there is between an acorn and the oak tree



which comes from it, or between the hen's egg and the fluffy chick which hatches out of it, you will know what we mean, for a plant or animal may change tremendously in the early days of its life. Sometimes there is so much alteration that unless we had been told that one had grown from the other we should never have guessed. Even the way in which the creature feeds and breathes may vary during the stages of its life.

An example of this is seen in the way in which a bird grows. No doubt you know something about chickens, and that the part which grows into the chick



is the tiny dark speck which you can sometimes see just near the yolk of the egg when the shell has been broken. The yolk and the white are there to provide food for the bird until it is hatched, but

after that it will feed in another way. While growing in the egg it takes in air which passes through the shell, and this is quite different from the way in which it breathes after hatching.

Of course, a chick can only grow if the egg has been kept safe and warm for about three weeks. Most birds build nests so that their eggs can be given this protection, and usually keep them warm by sitting in the nests and covering the eggs with their feathers.

It is great fun finding their nests—in hedges ; under the eaves of houses ; in haystacks ; in banks of earth ;



and sometimes in such unlikely spots as an old boot or between the spokes of a cart-wheel. One of the strangest places was chosen by some tom-tits, who built their nest and brought up their family in a letter-box.

A human baby also needs to be kept safe and warm while it is growing, so it has a very special kind of nest within the mother. The egg is formed inside her body, in an *ovary*, which is one of those parts which are called *glands*. We have glands in various places in the body, and each of them can be thought of as a sort of factory, for it has the work to do of making something. Some of them make substances which help us to grow, and we will think more about those later on.

When the egg has been made in the gland it passes down a tiny tube into the nest (which is sometimes called the *womb* or *uterus*). This is shaped rather like a pear, with its broad end uppermost. It is hollow inside and made of strong muscles, with a special kind of skin lining it, or *membrane* (as it is called), which helps to make a safe place for a baby to grow in. The position of the nest in the body is just right, too, for protecting the baby, for it is surrounded by strong bones. You know how at the part of our body which we call the hips there are some very large bones ; they are so joined that they make a sort of ring with a space in the middle.

If you look at a picture of a skeleton you will perhaps find their name—the *pelvis*. Talking (or rather writing !) of skeletons, have you heard the description given by the small boy who said that a skeleton was a man with his inside out and his outside off? Don't you think that was a very clever way of putting it?

Well, the nest is inside that ring of bones called the pelvis and the baby grows there, kept at the right temperature and safe because it is carried right inside its mother. It is very interesting to know that these bones are bigger in a woman than in a man, because of the protection they give to the nest.

As has been said before, the tiny egg does not look like a baby at all. If we were able to watch it growing, we should find that the egg, or cell, grows into two, but the two remain joined to each other. The two cells will then increase into four, and these become eight. Next the eight cells multiply into sixteen, and the sixteen are doubled into thirty-two, which then become sixty-four, until in this way the first cell has increased into thousands, all clustered together within the nest.

All these cells appear to be exactly alike, and it is hard to believe that later on they will grow into a baby, for they are still extremely small. Even after a baby has been growing for about two months it is still only about one inch long. As time goes on, many marvellous changes have to take place, and some of the cells will go to form the brain, others the bones, heart, lungs, nerves, hair, teeth, eyes, skin, and so on. Indeed, every part of the body is made from these cells, and after about nine months a complete baby will have grown.

Then it is ready to leave the nest and be born, and begin to live its life in the outside world. For this to take place the lower part of the nest opens, and the

baby passes out from the mother through a passage between the thighs. This is usually very narrow, but it increases in size to allow the baby to pass along, and then becomes small again. It is quite separate from those passages by which the waste of food and water leaves the body.

Just as we need food and air, so a baby needs them all the time it is growing in the nest. At first it is so small that it has no mouth or lungs or stomach, so it could not possibly get these things for itself, but the mother is able to give her baby food and air from her own body.

You know that when we breathe, the air goes into the little air spaces in our lungs, and then passes on through the thin membrane that lines them, and into the blood. And when we eat, our food has to be digested, by which we mean that it must be turned to liquid form, so that it can pass into the blood, when the little blood vessels can carry it to any part of the body that needs it.

When the baby is growing in the nest a good deal of the mother's food and air will still be used in this way, but some will pass into the special membrane which lines the nest. The baby is able to use them then, for when the egg first begins to grow it joins on to the lining membrane in such a way that food and oxygen can pass through. You know that funny little dent in the middle of your tummy; well, that is the place through which they passed, and is why you got on quite well for a long time without a nose or mouth. After you were born, you no longer needed to get air and food as before, so the opening just closed up and has left the mark you see.

Are you surprised at how much a mother loves each of her babies? Long before it is born, she knows she is caring for it in that nest, and takes extra care of herself and of what she eats and drinks, doing all she

can to help her baby to grow strong. Indeed, during all the months before birth a mother is giving it nourishment and protection.

Before a human baby is born its bones are all very soft—more like the gristle that we can waggle on the tips of our noses. And so you can imagine how necessary it is that it should be protected from knocks or jolts. That is why it is so important that the mother's nest should be in a place where it is kept safe.

A watery liquid is made inside the lining of the baby's nest, so that it becomes soft and "cushiony" all round it. You know how we sometimes use air or water cushions, which are so made that instead of filling them with feathers or down, the air or water acts as the padding. So the fluid acts rather like the stuffing of a nice soft pillow all round the baby, and protects it from any jolts or jars.

When you are a few years old a few bumps will not cause any serious damage. For example, sometimes you go upstairs in the dark, and when you get to the top you may think there is another stair to put your foot upon. If there is not, your foot comes down very heavily and you get a nasty jar, perhaps even giving a quite painful jolt to your body. But should a mother who was caring for a baby within the nest have a similar shock, it might suffer injury, but for this wonderful arrangement which will prevent such accidents from affecting the very delicate life which is growing inside.

Another thing which is necessary is that the nest should be kept at the right temperature in which the baby can grow healthily. And the sort of water-cushion also helps to do this. So you see the home in which we first lived was very up-to-date; it had a kind of central heating system, just as modern houses may have in the hot water pipes which keep them warm.

Sometimes a mother has twin babies. This is because

there are two ovaries where the egg cells are made, and it occasionally happens that each ovary may make a cell at the same time, or that one ovary may make two cells, so instead of one baby two grow in the nest. Twin babies are born one after the other, one perhaps being older by several hours. Such babies may be no more alike than ordinary brothers and sisters.

There are some twins, however, who are almost exactly alike, not only in looks, but in many ways. Often they like doing the same things, and while at school are found to be good or poor at the same subjects. This is because a cell which is beginning to grow in the nest splits into two, and the halves separate and each becomes a perfect baby; these are what are called "identical twins".

After the baby has been born, its life is very different from that spent in its home within the nest. There it was kept cosy and warm, and was so well protected that nothing disturbed its comfort. But now its mother has to make other arrangements for its care and protection, as it is going to live in a world which is nothing like the place where it spent its first nine months.

THREE.

GROWING BIGGER.

DURING its early days a new-born baby needs chiefly three things—food, air and sleep. In fact, it usually spends almost all the time when it isn't feeding, in sleeping. It still is unable to feed on the kind of things that you and I can, for it would not be able to digest them. During the time that the baby is growing, the mother's breasts have been getting ready so that as soon as the child has come into the world they can start to prepare its special food—the mother's milk. This is not made until the baby is born, and is formed in a very wonderful way by special glands in the breasts; it contains all the substances that will not only keep the baby alive, but also help it to grow and its bones to harden. Of course, when a child has cut its teeth, and is able to digest other things, it will no longer be fed only with milk by the mother.

Teeth take much longer to prepare for their work than most of us think, for they are really formed before we are born. In an X-ray photograph of a newly-born baby's mouth we can see the rows of teeth under the gums where they have been growing, though they may not come through till much later on. But we are able to see, not only these first teeth, but also the tiny beginnings of the second set—those which will not be cut until perhaps six or seven years later.

Teeth, like bones and other parts, can only be formed properly if we have the necessary food. So you can see another reason why it is not only important for the mother to be strong and well while she is guarding the baby in the nest, but also that she should eat the

right kinds of foods too. Milk helps bones and teeth to form ; that is one reason why it is good for a mother to drink cow's milk before her baby is born, as well as after. Milk is good for all of us, because in it there are other substances that we need too.

Most animals feed their young ones on milk, and many take a great deal of care of their babies, just as human mothers do. All the animals you can think of, such as lions or tigers, buffaloes or bears, foxes or deer, spend much time in looking after their young.

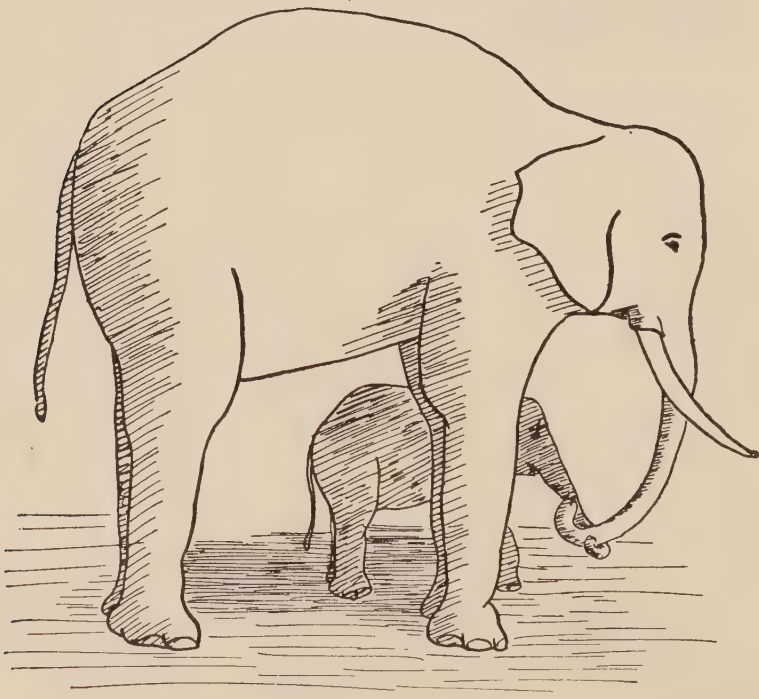


Just as we lived in a nest before we were born, so the mother animals care for their babies in the same way. And after they are born, the animals will do everything to protect their children from injury, and are very brave in their defence. If an animal is being hunted it will usually try to escape, but if the mother has a family she often will not run away and desert them, but will fight as long as she has strength. As you probably know, some baby animals are completely blind and helpless for some time after their birth and so need particular care.

Sir J. Arthur Thompson has told us how, one day when he was on the golf links, he saw a stoat gently carrying her baby in her mouth. When she saw him, she laid it down in safety and then advanced to defend it by attacking him. A very plucky thing for this tiny animal mother to do.

Human babies are very helpless, too, because their bones are not strong until some months after birth, whereas some animals grow more completely before they are born. The bones of a calf and foal are so hard that these creatures can stand up very soon after they leave the nest. For animals that live in herds, this is important, for the young ones can then move about with the older ones for protection. If a herd of musk-oxen is attacked, the males will form a square around the mothers and their babies, and will fight furiously to defend them against whatever enemy has appeared.

If a baby elephant is afraid, it may run to its mother and curl its trunk around hers, and find comfort in



doing it, just as a human child who is frightened will clasp its mother's hand. Some creatures which as a rule are very timid and nervous, show great courage when they have young ones to look after.

Animal mothers not only feed and protect their families, but they play games with them as well. Young animals are very full of fun, and so the mothers will often join in their play. If you were able to see a fox with her babies, you would find the cubs looking like balls of fur, romping about with their mother and having a fine time.

Those of you who have been to the Zoo will have seen the huge hippopotamus, which appears to be a very dull sort of animal. But to the baby hippo she must seem simply splendid. They live, when wild, in the rivers of Africa, and when the baby is young, instead of being taken for a sail in a boat, as we sometimes are, it sits on its mother's back as she swims along the river.

But perhaps the baby bat has the most exciting time, because it clings on to its mother as she makes her dashing, rapid flights in the air, twisting and turning in the deepening twilight.

On occasions we get a bit tired of being told to do things we do not wish to do, even though we know that it is for our good. Young animals, too, are taught many things by their parents and, like us, they are not always very keen on learning.

Some of you may have seen an otter swimming, diving and hunting for fish in the river, but who would think that when it was young it was not at all anxious to enter the water? It was born on land, and did not want to go in for its bathe, and it looked as though it was going to remain a land-lubber for life. Mother otter, however, was not going to spend the rest of her days catching food for her baby, so she encouraged



it to go in, but if it would not, it had to be taken in, squealing and protesting. Then it found what a fine place the river was and the exciting times it could have in chasing fish for food, so that life on land no longer seemed so pleasant as before.

Many of the things we are taught are to help us to earn our living when we are older, and mother animals train their babies to get their living too. For example, a tiger cub has to be taught how to hunt, and it has to learn thoroughly, because later on it would soon die unless it could catch its own dinner, as father and mother will not help it all its life. So the parents teach it how to stalk its prey, how to move through the long grasses without being seen, and the right way to approach the animal it wants to capture.

Another very important lesson baby animals have to learn is to recognise danger signals. Different kinds of birds and animals have signals which they sound as a warning to others. You will all have heard the warning cry of a bird, which sends the rest flying for shelter. Another method can be heard when rabbits are feeding. A fox, or some other enemy, may come along on the look-out for a meal. If a rabbit sees or smells the raider, he will give a thump on the ground with his hind legs, and the others will know there is



an enemy about and will bolt for their burrows, their white tails bobbing up as they scurry away.

Many animals go about in herds. Deer, bison and elephants are amongst these, and while the herd is feeding they may post

sentinels on the outskirts to give the alarm if danger arises.

Perhaps the funniest sentinels are the walruses, which live in arctic regions. They will lie down on the ice in one long row to go to sleep. A walrus at one end will sit up and look around him to see if all's well. It must be a quaint picture to see him with his ragged moustache, which looks as though it is badly in need of cutting, and his two tusks which appear as though they were great teeth falling out. If everything is safe he decides to lie down and have forty winks himself. First of all, however, he gives his next-door neighbour a nudge and wakes him up, and then lies down to the rest he has earned by being on guard. The neighbour who has just



been aroused to go on guard duty, gazes about him, and if no enemy is in view, he will, before returning to his sleep, wake up the next walrus. And so this goes on along the whole line of them. First one sits up, and then another, and as there may be as many as several hundred of them, it is an odd thing to see.

As young animals grow bigger and stronger they no longer need their parents to support them, for they are able to catch food for themselves. But they do not know all that their mothers did for them ; first of all in the nest before they were born ; then in feeding them with milk until they could live on more solid food ; also in teaching them how to hunt and to know the signals that would tell them that danger was lurking around. The young animals owe a lot to their parents, but being animals, they do not understand, and when they grow up they go away and cease to remember them.

As you grow older you may have to leave home and go away to work, perhaps even to the other side of the world. But never forget all that your mother has done for you, the life, health and strength she has given, so that you may grow into fine men or women. The love of the mother animals for their babies is very wonderful, but not one hundredth part so wonderful as the love of the human mother.

FOUR.

GROWING UP.

HAVE you ever wondered why we grow at such different rates, and why some people become so much taller or fatter than others? It used to be thought that it depended mostly upon our food ; in fact, you may still hear folk saying, " If you want to be a big girl, you should eat more suet puddings " ! But although we certainly do need the right kinds of food if we are to develop healthily, something else helps us as well.

Do you remember how we said that there were glands in our bodies which had the work of making something ? Well, some of these make substances which affect our height, fatness and so on.

Just near our brain is a small gland called the *pituitary*, which makes a substance that passes into the blood ; this carries it round the body, and it affects the growth of the bones. And the more of it that the gland makes the more we grow, while if not much is prepared we do not become so tall. Fortunately for most of us it does not work either too much or too little, so that we grow quite an ordinary amount, neither too tall nor too short. We do not yet know very much about what makes it work more in some folk than in others, causing so many differences in height. Occasionally a man becomes a giant, perhaps even eight feet high, and this is because the gland overworks.

On the other hand, in some people it may not form as much of the substance as usual, and that is the cause of dwarfs. Some dwarfs have been so famous that their descriptions have been handed down to us in history.

It was even said that a poet named Philetas of Cos, who lived about 330 years B.C., was famous for the fact that he wore little leaden shoes for fear that he might be blown away! In the Sixteenth Century, Queen Mary had a tiny page who was only about two feet high, and during the reign of Queen Victoria there was a messenger at the Houses of Parliament whose height was under three feet.

Another very interesting thing this substance has to do is partly to control the amount of fat of the body. Those of you who have read Charles Dickens' book "The Pickwick Papers" will remember a boy called Joe. He is often spoken of as the Fat Boy of *Pickwick*, because he was so very, very fat. Joe was a strange boy, and was not very keen on work. Indeed, there



were only two things Joe did really well. Those were, eat and sleep. When he was not sleeping he was eating, and when he was not eating he was sleeping. This sad state of affairs was due to disease of this gland.

Perhaps one day we shall discover just how to

cause this gland to work more or less, and then people might even be able to control their height. Do you remember in "Alice in Wonderland" how Alice found the bottle labelled "DRINK ME", and when she had drunk some of the contents felt that she was shutting up like a telescope? Then, after that, she saw the cake with "EAT ME" marked in currants, and found, on obeying the direction, that she grew and GREW and GREW till she was about nine feet high. It seems quite possible that one day scientists may find out how to give people doses of a substance which will make them taller — though hardly so quickly as Alice grew in her dream!

Even now there is one way in which we can see something which is rather like what happened to Alice when she drank from the bottle and shrank. For people can be made to get smaller, not in height but in width! In the front of the neck there is the *thyroid* gland which makes a substance which keeps most of us from becoming either too fat or too thin. Occasionally it happens that someone suffers from a kind of illness which stops the gland from working enough, and the person may grow very fat indeed. Now, when someone



is very fat for that reason, they can be given medicine containing the substance which the gland ought to be making, and so they get thinner again. But of course, it has to be done very carefully by a doctor, lest they should get too thin if they had too much !

This gland not only helps the body to grow, but helps to keep us bright and cheerful. If it did not start making its substance after we were born, we should be very dull and stupid.

Then there is another important factory named the *thymus*, situated behind the breast bone. This has the task of making a substance which regulates the rate of growth. If it stopped working in a young child, it would develop too quickly into a man or woman. So it is partly due to this gland that we grow steadily and healthily.

There are other glands that control our bodies too, and some that help them to change in various ways as we are growing up, and we are not going to try to tell you about all of them for there are so many. But you will have read enough about growing to show you what an interesting thing it is. It is something that we do, often without realising that it is going on—except when we notice the way in which we grow out of our clothes ! It is good to remember that ; for some people still speak of “growing pains”, although we are quite sure that if we are healthy, growth cannot possibly cause us any aches. The kinds of pains in legs or arms which used to be called “growing pains ” have really nothing to do with it, but often may be due to a very slight kind of rheumatism or muscle strain.

When boys and girls get into their 'teens, these glands which have been aiding growth begin to slow down their work. We should expect to find that if

these substances become less and less, then we should grow much less quickly. Yet strangely enough the opposite is the case, for as you all know we usually shoot up in height more rapidly when we get to thirteen years of age and over, than we ever did before. So we have to find out why.

The reason is quite simple, but very important. Ever since we were born there have been some glands in our bodies which have been lying idle. These now start working, and make substances which are going to take over the task of making us grow, which until now has been done by the others about which we have been thinking.

We not only get bigger, but we change quite a lot during our lives, although sometimes so slowly that we do not ourselves notice it until someone who has not seen us for a long time points it out by saying, "Why, I hardly knew you !"

Most of us long to grow up, and we are quite right to want to. Our bodies and minds alter in various ways, and it is well to know the reason for this. Do you remember that we told you of the glands of the mother which can make the tiny egg from which the baby grows? Well, these glands have other work to do, for they make a substance which helped her to grow up. They are given the name of the *sex glands*, and they make a girl develop into a woman, while in a boy there are glands which help him to grow to manhood; these are also called sex glands.

In a girl these glands are inside the lower part of the body, near to the nest, and they usually begin to work when she is about twelve years old, though with some people it may be earlier and with others much later. Some girls become rather fat then, but there is no need to worry for they usually become slimmer again quite soon. The shape of the body changes, and the hips

become wider in proportion to the rest of the body, and the breasts develop. These changes cause some of the differences between a girl and a woman. When these glands start working, hair begins to grow on parts of the body where it never has before, such as under the arms and between the thighs. We do not understand the purpose of this.

Have you ever thought about how our bodies must be always replacing parts as they get worn out? That does not mean that we do anything so sudden as the newts or caterpillars, who change their skins completely when they get too big for them, for ours change very slowly, bit by bit. Think of the nasty holes we might wear in the skin of our feet (just as we do in the soles of our shoes) if it were not for the way in which new skin grows to take the place of each piece that is worn away. Isn't it wonderful to realise that all this can go on so easily, a little at a time, that we just don't know when it is happening?

Inside our bodies, too, there is need for repair and renewal, and generally we are unconscious of it. But the nest, or womb, has a special method, as the lining of it is so made that it changes every four weeks or so. And when it does this, the tiny little blood-vessels underneath this membrane are left uncovered. Then they bleed slightly until the new lining has grown again, and so this causes the appearance of the slight bleeding at the passage between the thighs, which is another sign of growing up. Because it usually happens regularly every four weeks, it is often spoken of as the monthly period—or *menstruation*, from the Latin word meaning a month. It only takes place when the lining of the nest is being renewed, so it stops of itself as soon as the growth of new membrane has finished—generally in three or four days—and does not begin again until in about four weeks' time when the lining is renewed

once more. It is a good thing, for it is the way in which the nest is prepared for the time when it may have the most important part to play of forming the home for a baby before birth. During the nine months while the baby is in the nest the lining is not renewed, and so the periods stop until after it is born.

Some girls begin to have these monthly periods as early as ten or eleven years old ; others do not have them till fifteen or even older, because some grow up more quickly than others, just as some get taller more rapidly. Sometimes they may not happen regularly every four weeks, but perhaps with five or six weeks between them. With some illnesses, too, the periods may stop until the person is better.

At these times we wear something special between the thighs, so ask mother or some other grown-up to explain about it. Apart from that we are wise to do almost everything just as we usually do, provided that we feel well.

Warm baths—every day if it can be managed—are a fine thing during these periods for making the body feel really comfortable, and if you cannot manage a bath, a wash all over with warm water is good. Cold baths or swimming are not so good then, and most people find it better to avoid them. Plenty of exercise is necessary though, unless you do so much that you find that it makes you over-tired. One thing that exercise helps to do is to avoid constipation, and if the intestines or the bladder are allowed to store up the waste of food or water too long, that may cause us not to feel as well as we should. Unfortunately some girls who are not perfectly well, find that they feel worse during these times, or may get headaches or pains. This is sometimes a sign that a doctor may be needed to tell them what to do to get better, for these periods are quite healthy and girls should feel all right during them. There are

some who find that if they are not quite fit during the monthly periods, they may be more likely to become cross or worried over things. If they know this, it should help them to be on their guard, so that they can control these feelings more easily.

While we are growing it is important that our clothes should be loose enough. Those of you who ever help with the dressing of smaller brothers or sisters can help them by seeing that their clothes are not tight. As we increase in width, things that go round us need letting out. While growing in height, you need to remember that if garments like knickers are too short they may become tightly drawn up between the legs. This should be avoided, because the rubbing of clothes or anything else on the sensitive skin between the thighs is not good for it. Also it is not good for the armholes of garments to be worn when too small. Often small children may be seen wriggling because of the discomfort of this, and of course it doesn't help them a bit, but may only make them more uncomfortable.

It is extraordinary to see how sometimes people will go on putting up with tight clothes that may hurt their waists or make breathing difficult, because it may be the fashion. We cannot expect to grow easily and comfortably unless we have room in which to do it ! You will have seen pictures showing the way in which women used to wear very tightly laced corsets to try and make their waists as small as possible. Now we realise that it is not good to have tight things.

The way in which we dress also matters because the skin requires air. If we have loose clothes that are not too thick and heavy, the air can reach the surface of our bodies and the skin can carry on its work. This is why cleanliness is valuable too—to ensure that the small pores in the skin are not blocked up.

Of course, that does not mean that knicker elastics

should be so loose that you feel worried about their safety, and have to keep looking down to make sure that your lower garments are not showing ! It is not the fashion nowadays as it was in the early days of Queen Victoria, when some people did not think that a girl was at all properly dressed unless below her skirt there showed several inches of nice white frilly pantaloons !

We rather think that was a silly fashion, but probably people who lived then would think ours just as stupid. Although we know that it was not good for health to wear so much clothing as they did then, there is no more sense in wearing so little as some do now, so that the sun can scorch their skins. Unfortunately, the fashions in clothes are often not designed in the ways which would really be best for both health and comfort.

When we can choose our garments it is worth realising this, and if we really value our health we may decide sometimes to be brave enough to wear the things which suit us best, whether they are really fashionable or not.

As a boy grows up also, the sex glands in his body cause various changes to take place. Those of you who have bigger brothers may know how very proud a boy is when he sees on his face two or three hairs that mark the beginning of a moustache. Then he feels that at last he can start shaving like his father. Sometimes we rather want to laugh at this because it seems such an extraordinary thing to be glad about, but we would not if we realised that a boy is quite right to be pleased when he sees a sign that he is growing up to be a man—something which perhaps he wants to do more than anything else. At this time a boy often grows in height quickly and his muscles become stronger.

Then you know, too, how a boy's voice changes. When he is young his voice is very different from that of a man. It is because of the substances made by these

glands that this change takes place, causing the voice to become deeper. Until that change has finished his voice is "breaking" as we say—it may seem partly like a boy's and partly that of a man, or even something strangely new. That is why during that time boys who have been able to sing beautifully have to give it up because they cannot sing in tune.

In a boy these glands are outside the body, for they are in a tiny bag of skin, between the thighs, called the *scrotum*, and in front of this hangs a kind of tube which is called the *penis*.

You will remember that it is because of the way in which the nest is prepared that every girl has those monthly periods, but a boy does not have them because there is no nest in his body. But his sex glands make a whitish substance, called semen, and sometimes when the body has more than can be stored up, a little is discharged through the penis. But this only happens occasionally, and not regularly as monthly periods do.

FIVE.

FULL GROWN.

As we grow up our views change in many ways, and some of the things that we have liked most are no longer of interest, because of the new things that attract us. This is very true with regard to the way boys and girls think about one another. Before reaching their 'teens a lot of boys would say, "Girls are all right in their place, but they are a bit of a nuisance on the whole". At any rate, they do not want to have to be burdened with their company very much. Often girls at the same age only think of boys as a rather rough, untidy lot. So we find that generally boys want to play with boys, and girls prefer girl friends.

Yet when we get past thirteen years of age our ideas gradually alter, and girls and boys no longer think of each other as they did before. On the occasion of a Sports, quite a number of the fellows wanted to be introduced to a sister of one of the boys. So he said, "Right, if you give me a bar of chocolate, I'll give you an introduction". As he got a good many pieces of chocolate that way, you can guess how keen some of them were. But I wonder what would have happened if his sister had found out what he had been up to. Perhaps it is lucky for him that she did not !

This interest that boys and girls have in each other as they grow older is good, and it is a fine thing if we have plenty of both boy and girl friends, because boys and girls can help each other in many ways.

So far in our story of living things we have only been talking about mothers, but every baby needs to have a father as well as a mother, for the father

also helps to give it life. This is true of animals, too, you know, and some of the loveliest stories about them tell of the ways in which they live in families and care for their babies.

Sir J. Arthur Thomson (whose beautiful books on living things you ought to read) tells of the home making of the rooks. It begins with the time of courtship, when the birds choose their mates. The cock bird will show off his fine wings and tail, and sing. Though we do not think the rook's voice so beautiful as that of some other birds, no doubt it is lovely to the hen bird who can understand its meaning. He may also bring her little presents of tit-bits to eat. If she accepts him as her mate, they will share in the work of preparing their nest. Often one will sit high up in the tree mounting guard over the partly finished nest while the other



bird seeks suitable sticks, for other rooks may try to steal the material to save the bother of searching for themselves. You will have noticed how often a large number of rook families set up their homes in the same place—very much like people who build their houses in groups in towns. When the nest is finished the eggs must be made.

In the first chapter you will remember we learnt that the egg-cell from which we grew was made in a gland within the mother. But this cell by itself cannot develop into a baby unless a special kind of cell, sometimes called a *sperm*, which is made in the father's body, unites with it. Not until this has taken place can the egg-cell divide into two, then into four, and so on, as already described.

Different kinds of living things have different ways of causing the father and mother cells to join. When a hen bird has laid her egg in the nest it has, as you will know, a hard shell. Therefore, if the cell made in the cock bird's body is to unite with it, it must happen before the egg is laid and the shell formed. So the father's cell has to be placed in an opening beneath the hen's tail feathers, which leads to the gland where her cells are made. Sometimes you may see two birds, one looking as though it was trying to have a pick-a-back ride on the other. This is because the cock is placing the father cells in the hen's body. These cells leave the cock through an opening underneath his tail and so can enter the hen's body and unite with the egg-cells before the hard shell has grown.

When the eggs are laid, the mother and father birds take turns in the work of keeping them warm under their feathers, one sitting on the nest while the other seeks food or keeps watch. And when the baby chicks are hatched they depend upon both their parents, who spend all their time in fetching the large amounts of

food which are needed to help them to grow. Indeed, after the father and mother have fed their very hungry family, which eats more and more each day, they themselves are getting very thin, and must be glad when the



youngsters have grown stronger and can be encouraged to scramble out of the nest, and to fly and find food for themselves.

Most wild creatures probably do not need to learn very much, for they have instincts which give them the power to do many things without being taught. But some do need helping to make the first start at flying, feeding or drinking.

Even birds who will spend most of their days in water, still may not venture into it for the first time without some help from their parents. The bird called the grebe goes into the water with the young ones on her back. When they have grown too big for her to do all the work, one day, when they have been having

a ride like this, she will dive gently under the surface so that they are left floating. Then the babies' instinct makes them carry out just the right movements to enable them to swim.

In fishes the father does not lay the sperms within the mother, but in the water, where the mother also lays her eggs, so that eggs and sperms may join and grow into baby fishes.

We have thought about the way in which birds make a nest so that the eggs can have the warmth that they need, and later it forms the home for the young birds. Well, some fishes need warmth and protection. Though fishes lay their eggs in the water, it is not usually done until the warmer seasons of the year, when the sun will help to hatch them. Some fish will scoop a little hollow in a warm sunny spot in the shallow water, while other kinds build nests. One which makes its home in the seas around the Malay peninsula, makes its nest out of the strangest material you can imagine—air bubbles blown in a special way and made to stick together !

Animals such as elephants, and bears, rabbits and guinea pigs, and lots of others, where the baby is kept safe in the nest inside its mother until it is ready to be born, are also formed by the joining of egg and sperm.

These creatures have ways of showing their love for each other during courtship just as the birds have, even though they cannot sing such beautiful songs. Sometimes the male animal will try to show how much braver and stronger he is than any others who might want to mate with the female. When they have chosen each other as mates they will join the eggs and sperms. We believe they only do this because their instinct makes them ; probably they cannot understand in the way that we can that they are making it possible for their babies to grow. So, too, when the time comes

for the young to be born, animal mothers, without learning, seem to know by instinct just how to care for them.

For growth to start in human beings, the egg-cells made by the parents have to join together in the mother. When we were considering some of the things that help a boy's growth after he has reached his 'teens, we said that the sex glands were very important, because they make a substance which the blood carries throughout the body. Then there is a second substance they make called semen, and within this live the father's cells, or sperms. They are so very, very tiny that they cannot be seen with the naked eye. This semen is discharged from the body through the penis, and when people want to give life to a baby, the penis is placed in the passage leading to the nest. When a husband and wife do this it gives them joy. After the sperm cells have left the father's body, then one of them can join with one of the mother's egg-cells in her nest. And these two cells which have joined will then have the power to go on growing, and change in all the ways that you have been reading about. Right from the moment that a baby's life begins, that is, when the egg and sperm join, it will develop in such a way that it becomes either a boy or a girl, and the sex of a child, which is then decided, can never be altered.

As they grow up, both boys and girls develop so that one day they will be capable of being parents. It is, therefore, important that we should do all we can to keep our bodies and minds healthy. In fact our bodies get ready for the work that they might have to do, long before we are grown up enough for it to be good to use these powers of giving life. The tiny eggs may be formed in the nest as early as when a girl is only eleven or twelve years old ; the sex glands of a boy begin to make the sperms as soon as he starts to grow

up. But you can see what a sad thing it would be if they were allowed to join then, for a baby needs a real home which can only be given by two people who are old enough to be able to provide that, and give it all the help and training it needs. Also, of course, while a girl is still growing—which means till she is about twenty years old—she needs all her strength and food and air to help her to finish growing, and she hasn't really any to spare for giving to a baby.

The creating of a new life is a tremendous responsibility, though as you get older you may feel a desire to do this. But it should only be done when you are married, loving each other and sharing home and all things together as long as life lasts. Human babies take much longer than animals to grow up, and so need care and teaching from their parents for many more years. But also some creatures take great care of their families.

We have already seen what excellent mothers some animals are. Some of the animal fathers are splendid, too. After the babies are born, their chief task is to find food for the mother and the babies, and to protect them from attacks from enemies. But these things are sometimes difficult and dangerous, and the father has to use all his skill and cunning to keep the family safe.

Years ago men liked to go big-game hunting and shot down some of the magnificent creatures in the wilds. But nowadays more and more people prefer to "shoot" cinematograph films of these animals. This is much more clever, and far more dangerous and difficult than shooting with guns, and enables us to discover all sorts of wonderful things about the ways of animals and their families.

Who would think that the fierce lion—whose mighty roar strikes terror into the hearts of other animals in

the wilds—is quite a gentle father? The lionness has to look after the cubs while the lion is out capturing food, but when with his family, he takes his share in the home duties. For example, the babies will want bathing, so he will lick them all over with his tongue and keep their coats clean, as though they were being got ready to go to a Baby Show!

In some ways the apes are almost human in their care for their children. When a baby is about three months old, the mother will take hold of its hand and begin teaching it to walk, just as you may help your baby brother or sister. But before it learns to walk the father will carry it about, and as a rule they like to roam about the forest, so the fathers and mothers can be seen with their families out “hiking”.

Then the way the mothers and babies are cared for at night is very interesting. In many cases a nest is made in the trees, and the mother and children go

upstairs, as it were, to bed, while father sleeps on the door-mat at the foot of the stairs—that is to say, at the base of the tree trunk—ready to keep off any unwelcome visitors.



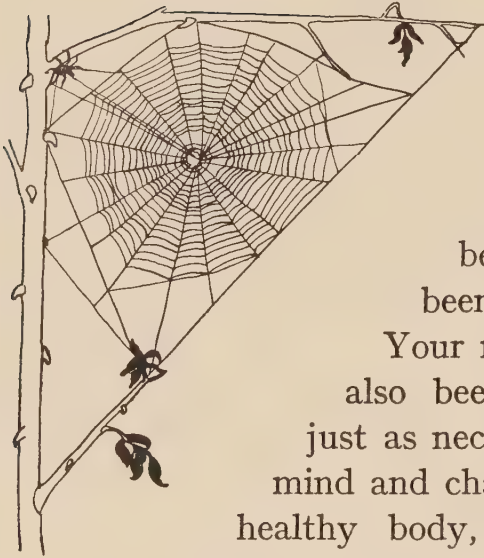
Some animals have to be looked after by their parents for a long time. The lion cub remains with his

for about two years before he has learnt enough about stalking prey, approaching it against the wind so that he will not be scented, and all the other arts of the chase. But no animals have such a long childhood and education as we have, and even the very best animal fathers and mothers cannot compare with the goodness of human parents.

So we all owe our lives to the love of both mother and father, and probably it will not be until you have grown up yourself, and are perhaps caring for your own boys and girls, that you will realise all that they have done. Still, even now we understand enough to enable us to decide to make father and mother proud of having us as their sons or daughters.

SIX.

GROWING CHARACTER.



So far in this book we have been thinking about how your body has grown. But all the time this has been going on, you have been growing in other ways. Your mind and character have also been developing. As it is just as necessary to have a healthy mind and character as it is to have a healthy body, we want to tell you something about the mind as well.

Many people say that the great difference between animals and mankind is that the former do almost everything by instinct, but that man has intelligence and can reason with his mind. Certainly the instincts of animals are very much more numerous than those that we possess, though, as we have seen, baby animals have to be taught some things. The simplest way to explain what is meant by an instinct, is to say that it is anything that we can do without having to learn how to do it. We know that female spiders are able to spin webs without having to go to a webspinners' class or school, and that the first web they make will be as perfect as one they may make after much practice. If you think quietly about this, you will find out how

few things there are that human beings know and do which they have not been taught, for even when imitating what others do we are learning.

Some creatures do the most wonderful things without having a lesson. Take the young cuckoos as an instance. Their parents come to this country from North Africa in the spring. Their eggs are laid in other birds' nests, and the parent birds then fly away and care nothing further about them, and in August they will return to Africa. The owners of the nests will sit on the cuckoos' eggs until the birds hatch out, and then feed them as though they were their own babies. In October the



young cuckoos have become very sturdy, and then they do a remarkable thing, for they begin a flight to Africa, the place from where their parents came. But

by then there is no cuckoo left in England who has come from Africa to tell them the time has arrived to fly to their winter quarters, or to lead them over the hundreds of miles of land and sea. Yet they find their way, unguided and untaught—that is to say, by instinct.

Another wonderful instinct is found in the opossum, a small animal which lives in parts of America and Australia, and often hangs upside down by its tail from the branches of trees—a regular straphanger! When it is in great danger, and cannot escape, it will lie absolutely still and stiff, pretending to be dead. Some of the creatures which might like to eat it will only do so if they can catch it alive, and when one appears to be lifeless, they will leave it. So this instinct of the opossum helps it to save its life by feigning death. It

must be rather unpleasant, however, as the animal which would like to make a meal of it may not only smell it, but actually pick it up, and if the opossum were to make the slightest movement it would certainly be its last.

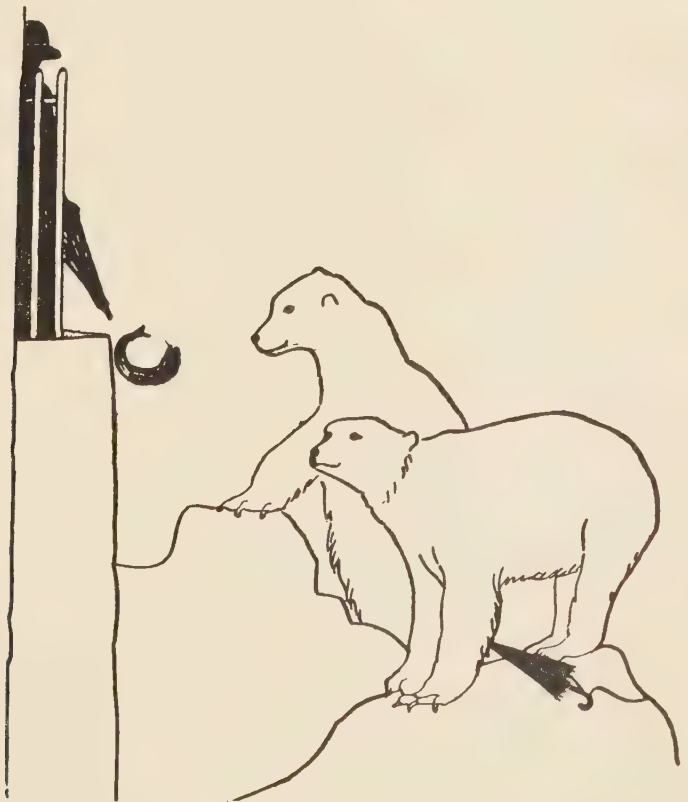


An instinct of the hare is wonderful, too. The young ones are

called leverets, and lie in a nest of grass. When their mother has to leave them for a while, she gives a tremendous jump out of the nest, sometimes as long as twelve feet, so that no scent will be left which might lead stoats, weasels or other enemies to her family.

But while we marvel at these wonderful instincts, there are other animals which are very clever because they can be taught all sorts of useful things, and some even seem to be able to think out things for themselves.

In the London Zoo there lived a very fine polar bear, known as Sam. He had a strange liking for collecting visitors' umbrellas, and discovered a very clever way of doing so. On a ledge near the bars of his cage he would put pieces of food, and then pretend that he could not reach them. Sooner or later a kindhearted visitor would feel sorry for poor Sam, and try to poke



the food nearer to him. As soon as the umbrella showed through the bars, Sam would snatch it from his benefactor's hand and carry it off in triumph. A very smart piece of trickery by a polar bear.

An amusing story is told by Sir Charles Sherrington, who had been studying chimpanzees in a room. As he left he closed the door, and decided to look through



the keyhole to see what the chimps were doing when left alone. And he was surprised to see the eye of one of them looking through the keyhole, apparently to see what *he* was doing. So you see that it was behaving as intelligently as a human being !

But it is in mankind that intelligence reaches its highest development, and the very cleverest animals cannot really be compared with man. The more intelligent we become, the less we depend upon instincts. We also learn to control them, for when an instinct is not controlled it may be very far from a blessing.

Probably all of you will have seen a very good example of this in moths, which have an instinctive desire to approach a light. How many have flown into the flame of a candle, and singed their wings? Yet they learn no lesson from it, for they return again and again, until their lives end in the flame.

A most extraordinary slavery to instinct is amongst the lemmings, which are something like dormice. Sometimes when food is scarce, hundreds of them will trek from one part of the country to another, hoping

to find more fertile pastures. When they go on these cross-country marches they always go straight ahead, turning neither to the right nor to the left. If they reach a haystack, they will not turn aside to go round it, but eat through it. Sometimes something which they cannot go through may obstruct their progress, and then they will go over the top. Should they reach the sea, they will still forge ahead, plunging into it, but they are not strong enough to make the ocean crossing, so will swim until exhausted and then be drowned. So you see that though instincts are often very useful, unless they can be controlled, they may injure rather than help.

One of the most powerful instincts we have is called the instinct for self-preservation. This means that every normal person wants to live, and if his life is in danger he will want to save it. But for this instinct we should all soon be dead. If we are crossing a road and a motor car suddenly appears, apparently from nowhere, we shall give a mighty leap into safety, thanks to this instinct. If we visited a circus and a lion made its escape, we should try to do likewise! Yet there are times when men feel it would be dishonourable to allow this instinct to work, and so will bravely face death instead. Many illustrations of such conduct can be found in the history of the sea. A ship may be so battered about by a storm that she is sinking, and the captain orders the boats to be lowered. Like everyone else he wants to save his life, but will control his desire, and will remain on board until everyone else has left the ship, though he knows that this may mean that it will be too late afterwards for him to save himself.

Very few of us will have cause to give our lives for other people, but throughout the whole of life we can make sure that the things we do will help others and not

injure them. How far we succeed depends on what we call *character*.

We do not have to be clever to develop good characters—indeed some clever people have very poor characters, when they do not possess healthy minds. Some people, though they may take quite a lot of care of their bodies, do not think very much about their minds. It is a pity not to try to understand at least a little about them, because it is really most interesting.

We do not always realise, until it is pointed out to us, how our bodies and our minds work together and influence each other. Probably you know how, when we think of something that we want to do with our arms and legs, the brain sends a kind of message by means of the nerves and they cause our muscles to make the movement.

That seems pretty straightforward, and that is the way in which a number of parts of the body are controlled—our legs, and arms, fingers and toes, are all dependent upon the brain. Many activities go on while we are almost unconscious of them. Breathing is like this. But this is not always so, because you know how we can to some extent decide whether we will take in air quickly or slowly, or even hold our breath for a short time.

A baby is able to breathe as soon as it is born without ever learning anything about it, and we can all of us go on breathing whether we are asleep or awake without giving any thought to it, while our minds and bodies may be busy on other work.

Have you ever thought what a lot of things we may do all at the same time with our bodies and minds? Think what takes place as you go to school in the morning, should you happen to be late. Part of your brain may be causing the nerves to make your muscles

move so that you are walking quickly ; you may be thinking about how dreadful it will be if you get to school late, or about the work which you have learnt for the day. You may imagine yourself having to walk in after the others, and see a kind of picture of it "in your mind's eye". The pumping of the heart will send some of the blood to the lungs to collect up the oxygen which has been breathed in, and carry it, together with nourishment from food, all over the body. Meanwhile parts of the body will be growing, and glands will be hard at work to make the various substances that are needed for this.

Think how very strange it would have been if we had been so made that we could only do one thing at a time—if, for example, we could only use our muscles in running provided that we were not using our eyes or ears. If you try to realise what this would mean, you will agree that it is a good thing that we are able to carry out so many processes at the same time.

As long as we are healthy these activities fit in together easily, but they can sometimes affect one another. For example, we find that the thoughts of a person who is very worried, or sad, or bad-tempered (let's hope that this is never true of you) may prevent the proper working of the glands in the stomach which help to digest food, so that indigestion may follow. This means that if we want to avoid indigestion, we should not only eat food which agrees with us, but try to think only the kind of thoughts that will be good for us, too.

This shows how the mind can affect the body. But the opposite is also true ; that the body can affect the mind. Have you ever noticed that when a small child is thoroughly cross and irritable, so that Mother says, " Oh, dear. I think he must have got out of bed the wrong

side this morning," she may go on to say, "I do hope he isn't sickening for something"? This is because she knows that illness sometimes may affect the temper, changing a person who is usually happy and good-tempered into rather an irritable one. Of course, as we grow older we learn that even if we do feel like this it is a good thing to control it, because there is no need for other people to suffer just because we are feeling a bit wretched.

As human beings live in communities, that is to say in villages, towns, or cities, an action by one person may affect the other members of the community. A lot of the unhappiness and sorrow in the world is due to the fact that some people only think of themselves, and so develop selfish characters, and consequently do things which hurt other people. As we grow up we should try and make sure that our actions will not cause pain to others, particularly to those weaker than ourselves.

Fortunately, there are countless people who not only do nothing to cause suffering, but do all they can to bring happiness, even perhaps suffering themselves in their endeavours. Think of some doctors who, through trying to discover the cure of diseases, have lost their own lives. There is no greater love than this, that one should give his life for others.

Many animals live in communities, and sometimes set excellent examples to us by the way in which they all work together for the common good. The beavers are interesting in this connection. By collecting sticks of various sizes they build across a river a dam, which they may also strengthen with mud and stones. This, of course, increases the amount of water above the dam, and they then proceed to build a village. Their houses are made of mud and sticks, and will have two rooms—one in which to have their meals and sleep,

and the other as a storehouse for food. There is a door beneath the level of the river, so that water is laid on to the house—quite a modern and up-to-date residence !

Tree felling is a very important task in the beavers' life, and they gnaw round the trunks until the trees



collapse to the ground. When they have used all the trees near to the village, they have to go further afield. But carrying the twigs and sticks over land is rather a slow and trying job, so the members of the village combine together and cut a canal, and when it is filled with water they swim along it carrying the timber to their village homes.

But the most striking illustration of the way in which these creatures work together for the welfare of all, is found when the village becomes over-populated. Then some of the inhabitants—it is believed the older

and more experienced—will leave it and found a village elsewhere—not perhaps a garden city, but at least a city built amidst water and canals, a sort of Beaver Venice !

Do you recollect that we said that when the sex glands begin working, we take a greater interest in the opposite sex ? This is a normal thing, and we say that it is a result of the sex instinct, and it may cause people to desire to transfer the sperms from the male into the female. But we have already seen that this should only be done if we are married. So the sex instinct has to be kept under control, even as we saw with that of self-preservation, so that sex will be of value and not harm.

As you grow up this instinct will get stronger. If the day arrives when you have your own home and family, you will be very happy and proud. But until that day comes, you can also use this wonderful instinct so that it will assist you to be helpful to the rest of the community. That is to say, you will use the energy it has to give you in other ways than creating a baby. While at school, we can use it in our work of learning ; in games and other activities. Scientists who study the mind have a long name when describing this, for they call it *sublimation*. It really means that the sex instinct provides us with a kind of energy which can be used to create ideas, and other things, as well as new life. Whether you succeed in this will depend, as will your success in developing character, on the health of the mind—your thoughts.

Our attitude of mind to all things connected with sex is important. That is why we have explained so much in this book, for when we understand something about our growth, we realise what a pity it is that some people think of it as a subject to joke about, or of which to be ashamed.

Some men and women never marry, and there are many reasons why they may not. Perhaps they have never met anyone whom they have loved sufficiently, or perhaps the person whom they loved has died, and they feel that they cannot care for anyone else as much. Though some people do not marry, and are never creators of new lives, they can still create things of value to the world, for whether people marry or not, this can be done in various ways. It may be through art, and the production of beauty. Many of the finest poems and books are due to men and women using the energy given to them by sex in creating great ideals to help their fellows to live nobly. Clergy, nurses, teachers and social workers are very often people who use this instinct in the service of other people, by seeking to make life easier and happier for them. Then there are many people who, though they have no boys or girls of their own, will give love and care to those who may have lost their parents.

When we think of this marvellous story of growth, we remember the psalmist who thousands of years ago wrote, "I am fearfully and wonderfully made, and that my soul knoweth right well". As we have seen, this life which has been given to us must be lived so that it is also of value to other people, as well as to ourselves. That does not mean that we should not enjoy life, but that we should help others to enjoy it too. That is what we think Christ meant when He said we were to love our neighbours as ourselves, for if we do this, how great our love for them would be. So let us try to use the gift of life, not selfishly, but for the benefit of mankind.

SEVEN.

A LITTLE BIT EXTRA.

We have really finished writing this book, though we should like to go on, for there are other interesting things we should like to tell you. Also there may be other questions to which you might wish to know the answers. But perhaps you would get tired of continuing to read, so we have decided to stop, and if you want to know any more we hope you will ask father and mother.



Printed by STANLEY L. HUNT, The Printeries, Rushden, Northants.

